



NASA STTR 2012 Phase I Solicitation

T15.01 Cross cutting Avionics for Beyond Earth Orbit Space Exploration

Lead Center: JSC

Participating Center(s): KSC, MSFC

As NASA human exploration and science missions move further from Earth and become increasingly more complex, they present unique challenges to the on-board avionics systems. Avionics systems in space vehicles are significant size, weight and power (SWaP) as well as cost drivers. Future destinations such as L2, near-earth asteroid, Mars, etc. are characterized by long durations, vast distances and harsh environments and call for significant advances in on-board processing, autonomy, reliability, fault-tolerance and redundancy. Advanced technologies and approaches to avionics systems and its components are needed to support these challenging mission requirements and to safely bring crew back to Earth.

Avionics provides cross- capabilities across different sub-systems and is a prime candidate for commonality between different missions and programs leading to savings in the design, development and testing, logistics (sparing, reuse, and re-purposing of hardware) and operational costs.

To support exploration mission objectives and requirements, advances in emerging avionics technologies (processors, networks and network devices, memory cards, human interfaces including visual, tactile and auditory interfaces, etc.) and associated foundational technology are required. Areas addressing miniaturization, radiation and extreme temperature environments such as radiation hardened by design, Rad-hard extreme temperature technology, and electronics packaging, etc. are of particular interest.

The focus of this subtopic is to support the development and advancement of cost-effective avionics technologies while keeping a unified approach to promote commonality of systems between multiple missions and/or programs. The ultimate goal is to develop a common avionics framework and a catalog of components that can be integrated into a space vehicle in the next 6-10 years.

